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EXAMINER

JACOB, MARY C

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 11/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/542,736

Applicant(s)

FURTADO ET AL.

Examiner

Mary C. Jacob

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/19/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-16 have been presented for examination.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 40. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities. Appropriate correction is required.
4. Page 9, line 18 recites "oAAf" and should read "of".

Claim Objections

5. Claims 1-16 are objected to because of the following informalities. Appropriate correction is required.
6. Claims 1-16 include recitations of "seat assembly" and "prototype seat assembly". If "seat assembly" and "prototype seat assembly" refer to the same limitation (see rejection 35 U.S.C. 112, second paragraph below referring to this), the claim language should be changed so that either "seat assembly" or "prototype seat assembly", not both, are used throughout the claim language for consistency and to eliminate confusion.
7. Claim 2 recites, "seat parameters of the basic model are most significant", it would be better if "of the basic model" was removed so the claim reads the same way as the limitation in claim 1, lines 7-8 so that it is further limiting.
8. Claim 2 recites, "with the potential to influence" in line 4. It would be better if written either "with potential to influence" or "with a potential to influence".
9. Claim 3 recites, "the detailed build", it would be better if written, "the detailed model".
10. Claim 5 recites, "obtain the data necessary" in line 2, it would be better if written "obtain data necessary".
11. Claim 10 recites, "the provided prototype seat assembly" and "the provided test dummy", it would be better if "provided" was deleted.

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12. Claim 10 recites, "the results of optimizing", it would be better if written "according to results from optimizing...", or re-worded somehow to eliminate use of the phrase "the results" to avoid problems with antecedent basis.

13. Claim 12 recites, "on the simulation software", it would be better if written, "using the simulation software".

14. Claim 13 recites, "with the potential to influence" in line 4. It would be better if written either "with potential to influence" or "with a potential to influence".

Claim Rejections - 35 USC § 112

15. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

16. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

17. Claim 1 recites the limitation "the prototype seat assembly surface" in line 4. There is insufficient antecedent basis for this limitation in the claim.

18. Claim 1 recites the limitation "the seat assembly" in line 6. There is insufficient antecedent basis for this limitation in the claim and it is unclear whether "the seat assembly" is intended to refer to "the prototype seat assembly" or another seat assembly.

19. Claim 1 recites "optimizing the most significant parameters" in line 13. It is unclear whether "the most significant parameters" are the "most significant parameters"

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determined from the simulations on the basic model in lines 7-8 or the "most significant parameters" determined from the simulations on the detailed model in lines 11-12, or includes both sets of "the most significant parameters".

20. Claim 2 recites the limitation "the optimization range" in line 6. There is insufficient antecedent basis for this limitation in the claim.

21. The term "the optimization range" in claim 2 is a relative term which renders the claim indefinite. The term "the optimization range" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

22. The term "ideal ranges" in claim 2, line 11 is a relative term which renders the claim indefinite. The term "ideal ranges" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

23. Claim 2 recites the limitation "the significant seat parameters" in line 11. There is insufficient antecedent basis for this limitation in the claim.

24. Claim 2 is directed to determining the "most significant parameters" by running simulations on the basic model, however, the further limitations of the claim are directed to determining "significant seat parameters". It is unclear whether these "significant seat parameters" are the "most significant parameters" or are a different set of parameters.

25. Claim 2, lines 11-12 recite, "and determining ideal ranges for each of the significant seat parameters when combined with the other significant seat parameters".

It is unclear what parameters “the significant seat parameters” and the “other significant seat parameters” refer to. Do “the significant seat parameters” refer to the “seat parameters” *not* disregarded in lines 9-10 and do “the other significant seat parameters” refer to the “seat parameters” that *are* disregarded in lines 9-10?

26. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the determination of which seat parameters are most significant. The claim limitations recite determining “significant seat parameters”, but do not recite a step wherein the “most significant seat parameters” are actually determined.

27. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the determination of which of the seat parameters are most significant. The claim limitations recite determining overall significance of each of the seat parameters and disregarding any seat parameters having little or no significance, but do not recite a step wherein the “most significant seat parameters” are actually determined.

28. Claim 4 recites “identifying the seat parameters previously determined to be most significant to meeting the desired objective” in lines 3-4. However, it is unclear whether this limitation is directed to the parameters determined to be most significant to meeting the desired objective in claim 2 or the parameters determined to be most significant to

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meeting the desired objective in Claim 3 or whether the limitation is directed to a combination of both seat parameters previously determined in claims 2 and 3.

29. The term "ranges" in claim 4, line 6 is a relative term which renders the claim indefinite. The term "ranges" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

30. Claim 7 recites the limitation of "validating the basic model with the sled test data to ensure accurate modeling of the prototype seat assembly". However, Claim 1, lines 4-5 recite, "building a basic model of the prototype seat assembly *surface*". Therefore, it is unclear as to whether Claim 7 is directed to validating the basic model to ensure accurate modeling of the prototype seat assembly *surface* as recited in Claim 1 or whether the limitation in Claim 1 is actually intended to be directed to building a basic model of the prototype seat assembly and not the assembly *surface*.

31. Claim 9 recites: "further including the step of running a final sled test on the modified prototype seat assembly with the test dummy to obtain the data necessary to show advancement towards the desired objective". Since the "prototype seat assembly" has only been built in simulation software, and the "test dummy" is concluded to be a physical thing, it is unclear how a final sled test on the modified prototype seat assembly, which is modeled in software, can be run with a physical test dummy.

32. Claim 10 recites the limitation "the data" in line 5. There is insufficient antecedent basis for this limitation in the claim.

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33. Claim 10 recites the limitation "the seat assembly" in line 5. There is insufficient antecedent basis for this limitation in the claim and it is unclear whether "the seat assembly" is intended to refer to "the prototype seat assembly" or another seat assembly.

34. Claim 10 recites the limitation "the prototype seat assembly surface" in line 7. There is insufficient antecedent basis for this limitation in the claim.

35. Claim 10 recites "optimizing the most significant parameters" in line 20. It is unclear whether "the most significant parameters" are the "most significant parameters" determined from the simulations on the basic model in lines 12-14 or the "most significant parameters" determined from the simulations on the detailed model in lines 18 and 19, or includes both sets of "the most significant parameters".

36. Claim 10 recites the limitation of "validating the basic model with the sled test data to ensure accurate modeling of the prototype seat assembly" in lines 9-10. However, lines 7-8 recite, "building a basic model of the prototype seat assembly *surface*". Therefore, it is unclear as to whether the basic model is intended to model the "prototype seat assembly" or the "prototype seat assembly *surface*".

37. Claim 10, lines 18-19 recite the following limitation "determining which of the seat parameters are most significant to meeting the desired objective by running simulations on the detailed model". It is unclear as to whether "the seat parameters" is directed to the "seat parameters" recited in line 11 or the "seat parameters of the basic model" most significant to meeting the desired objective in lines 12-13, or whether the limitation includes a combination of both.

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38. Claim 10, line 20 recites the following limitation "optimizing the most significant parameters". It is unclear whether the "most significant parameters" are the "most significant parameters" in lines 12-13, or lines 18-19, or both.

39. Claim 10, lines 21-24 are directed to "modifying the prototype seat assembly" and "running a final sled test on the modified prototype seat assembly with the test dummy to obtain the data necessary to show advancement towards improving rear impact performance", however, it is unclear whether the "modified prototype seat assembly" refers to a physical "prototype seat assembly" or a modeled "prototype seat assembly". Further, if the limitations refer to a modeled "prototype seat assembly", it is unclear how a sled test can be run "on the modified prototype seat assembly", which is a software model, with a physical test dummy.

40. Claim 11 recites the limitation "the data required as input properties" in line 2. There is insufficient antecedent basis for this limitation in the claim.

41. Claim 12 recites the limitation "the seat geometry" in line 3. There is insufficient antecedent basis for this limitation in the claim.

42. Claim 12 recites the limitation "the joint properties" in line 4. There is insufficient antecedent basis for this limitation in the claim.

43. Claim 12 recites the limitation "the foam and suspension stiffness" in line 5. There is insufficient antecedent basis for this limitation in the claim.

44. Claim 12 recites the limitation "the contact points" in line 7. There is insufficient antecedent basis for this limitation in the claim.

45. Claim 13 recites the limitation "the optimization range" in line 6. There is insufficient antecedent basis for this limitation in the claim.

46. The term "the optimization range" in claim 13 is a relative term which renders the claim indefinite. The term "the optimization range" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

47. The term "ideal ranges" in claim 13, line 11 is a relative term which renders the claim indefinite. The term "ideal ranges" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

48. Claim 13 recites the limitation "the significant seat parameters" in line 11. There is insufficient antecedent basis for this limitation in the claim.

49. Claim 13 is directed to determining the "most significant parameters" of the basic model, however, the further limitations of the claim are directed to determining "significant seat parameters". It is unclear whether these "significant seat parameters" are the "most significant parameters" or are a different set of parameters.

50. Claim 13, lines 11-12 recite, "determining ideal ranges for each of the significant seat parameters when combined with the other significant seat parameters". It is unclear what parameters "the significant seat parameters" and the "other significant seat parameters" refer to. Do "the significant seat parameters" refer to the "seat

parameters” not disregarded in lines 9-10 and do “the other significant seat parameters” refer to the “seat parameters” that are disregarded in lines 9-10?

51. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the determination of which seat parameters are most significant. The claim limitations recite determining “significant seat parameters”, but do not recite a step wherein the “most significant seat parameters” are actually determined.

52. Claim 14 recites the limitation “the material properties” in line 4. There is insufficient antecedent basis for this limitation in the claim.

53. Claim 14 recites the limitation “the seat structure components” in line 4. There is insufficient antecedent basis for this limitation in the claim.

54. Claim 15 further limits “the step of determining which of the seat parameters *of the detailed model* are most significant to meeting the desired objective”, however, there is no step recited as such in the previous claims. Therefore, it is unclear what step in the previous claims this is further limiting. It is noted that Claim 10 recites the following step: “determining which of the seat parameters are most significant to meeting the desired objective by running simulations on the detailed model”, however, these steps are not equivalent.

55. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the determination of which seat

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parameters of the detailed model are most significant. The claim limitations recite, "determining the overall significance of each of the seat parameters" and "disregarding any seat parameters having little or no significance", but do not recite a step wherein the "parameters of the detailed model" that are "most significant" are actually determined.

56. Claim 16 recites "the most significant seat parameters" in lines 5-6. However, it is unclear whether this limitation is directed to the parameters determined to be most significant to meeting the desired objective in claim 13 or 15 or whether the limitation is directed to a combination of both seat parameters previously determined in claims 13 and 15.

57. The term "ranges" in claim 16, line 6 is a relative term which renders the claim indefinite. The term "ranges" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

58. Due to the number of 35 U.S.C. 112, second paragraph rejections, the examiner has provided a number of examples of the claim deficiencies in the above rejection(s), however, the list of rejections may not be inclusive. Applicant should refer to these rejections as examples of deficiencies and should make all necessary corrections to eliminate the 35 U.S.C. 112, second paragraph problems and place the claims in proper format.

Due to the vagueness and a lack of a clear definition of the terminology and phrases used in the specification and claims, the claims have been treated on their merits as best understood by the examiner.

Claim Rejections - 35 USC § 102

59. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

60. Claims 1-16 are rejected under 35 U.S.C. 102(a) as being anticipated by Shin et al (“Occupant Analysis and Seat Design to Reduce Neck Injury From Rear End Impact”, International Journal of Crashworthiness, Volume 8, Number 6, pages 573-581, January 2003).

61. As to Claim 1, Shin et al teaches: a method of designing seat assemblies for meeting a desired objective using a prototype seat assembly, a test dummy, and simulation software, said method comprising the steps of: building a basic model of the prototype seat assembly surface using the simulation software (page 573, column 2, lines 14-17); identifying a plurality of seat parameters for designing the seat assembly (page 577, column 2, paragraph 2); determining which seat parameters are most significant to meeting the desired objective by running simulations on the basic model (page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); building a detailed model of the seat assembly using simulation software for a more accurate

representation of the seat assembly (page 578, column 1, lines 1-4, column 1, line 14-column 2, line 21); determining which of the seat parameters are most significant to meeting the desired objective by running simulations on the detailed model (page 578, column 2, lines 11-17, page 579, paragraph 1); optimizing the most significant parameters to best meet the desired objective (page 578, column 2, lines 11-21; page 579, paragraph 1, page 580, column 1, lines 6-11); and modifying the prototype seat assembly according to the results of optimizing the most significant parameters (page 578, column 2, lines 21-30; page 579, second paragraph-page 580, paragraph 2).

62. As to Claim 2, Shin et al teaches: wherein the step of determining which seat parameters of the basic model are most significant to meeting the desired objective by running simulations on the basic model further includes the steps of: identifying the seat parameters with the potential to influence the test dummy in rear impacts (page 547, column 1, lines 6-10; page 577, paragraphs 1 and 2); determining the optimization range for each of the identified seat parameters (page 578, column 1, line 23-column 2, line 9; Table 4); optimizing each of the identified seat parameters separately (page 578, column 2, lines 9-15); determining the overall significance of each of the identified seat parameters (page 579, paragraph 1 and Table 7); disregarding the identified seat parameters having little or no significance in meeting the desired objective (page 579, paragraph 1, Table 7); and determining ideal ranges for each of the significant seat parameters when combined with the other significant seat parameters (page 580, column 1, lines 6-11).

63. As to Claim 3, Shin et al teaches: wherein the step of determining which of the seat parameters are most significant to meeting the desired objective by running simulations on the detailed model further includes the steps of: identifying the seat parameters previously determined to be significant to the rear impact performance of the basic model of the seat assembly (page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); optimizing each of the seat parameters separately by running simulations on the detailed build (page 578, column 2, lines 9-15); determining the overall significance of each of the seat parameters (page 579, paragraph 1 and Table 7); and disregarding any seat parameters having little or no significance in meeting the desired objective (page 579, paragraph 1, Table 7).

64. As to Claim 4, Shin et al teaches: wherein the step of optimizing the most significant parameters to best meet the desired objective further includes the steps of: identifying the seat parameters previously determined to be most significant to meeting the desired objective ((page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); running simulations on the detailed model with various combinations of the most significant seat parameters to determine the best combinations and ranges of those seat parameters (page 578, column 1, line 23-column 2, line 17; Table 4); and choosing one best combination for meeting the desired objective of the seat assembly (page 578, column 2, lines 13-15).

65. As to Claim 5, Shin et al teaches: the step of running a sled test on the provided prototype seat assembly with the provided test dummy to obtain the data necessary to

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create an accurate model of the seat assembly using the simulation software (page 573, column 2, lines 14-22).

66. As to Claim 6, Shin et al teaches: the step of running component level tests on the prototype seat assembly to provide the data required as input properties to build a model of the seat assembly using the simulation software (page 577, column 2, lines paragraph 2; Table 4 and description).

67. As to Claim 7, Shin et al teaches: further including the step of validating the basic model with the sled test data to ensure accurate modeling of the prototype seat assembly (page 573, column 2, lines 14-21; page 547, column 2, line 24-page 575, column 1, line 2; page 580, column 1, "Conclusions", lines 7-8).

68. As to Claim 8, Shin et al teaches: further including the step of validating the detailed model with the sled test data to ensure accurate modeling of the prototype seat assembly (page 573, column 2, lines 14-21; page 547, column 2, line 24-page 575, column 1, line 2; page 580, column 1, "Conclusions", lines 7-8).

69. As to Claim 9, Shin et al teaches: further including the step of running a final sled test on the modified prototype seat assembly with the test dummy to obtain the data necessary to show advancement towards the desired objective (page 573, column 2, lines 21-22; Figure 4; page 580, column 1, lines 12-23; page 580, column 1, lines 7-8).

70. As to Claim 10, Shin et al teaches: a method of designing seat assemblies to improve rear impact performance using a prototype seat assembly, a test dummy, and simulation software, said method comprising the steps of: running a sled test on the provided prototype seat assembly with the provided test dummy to obtain the data

necessary to create an accurate model of the seat assembly using the simulation software (page 573, column 2, lines 14-21); building a basic model of the prototype seat assembly surface using the simulation software (page 573, column 2, lines 14-17); validating the basic model with the sled test data to ensure accurate modeling of the prototype seat assembly (page 573, column 2, lines 14-21; page 547, column 2, line 24-page 575, column 1, line 2; page 580, column 1, "Conclusions", lines 7-8); identifying a plurality of seat parameters for designing the seat assembly (page 577, column 2, paragraph 2); determining which seat parameters of the basic model are most significant to meeting the desired objective by running simulations on the basic model (page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); building a detailed model of the seat assembly using the simulation software for a more accurate representation of the seat assembly (page 578, column 1, lines 1-4, column 1, line 14-column 2, line 21); validating the detailed model with the sled test data to ensure accurate modeling of the prototype seat assembly (page 573, column 2, lines 14-21; page 547, column 2, line 24-page 575, column 1, line 2; page 580, column 1, "Conclusions", lines 7-8); determining which of the seat parameters are most significant to meeting the desired objective by running simulations on the detailed model (page 578, column 2, lines 11-17, page 579, paragraph 1); optimizing the most significant parameters to best improve rear impact performance (page 578, column 2, lines 11-21; page 579, paragraph 1, page 580, column 1, lines 6-11); modifying the prototype seat assembly according to the results of optimizing the most significant parameters (page 578, column 2, lines 21-30; page 579, second paragraph-page 580, paragraph 2); and

running a final sled test on the modified prototype seat assembly with the test dummy to obtain the data necessary to show advancement towards improving rear impact performance (page 573, column 2, lines 21-22; Figure 4; page 580, column 1, lines 12-23; page 580, column 1, lines 7-8).

71. As to Claim 11, Shin et al teaches: the step of running component level tests on the prototype seat assembly to provide the data required as input properties to build a model of the seat assembly using the simulation software (page 577, column 2, lines paragraph 2; Table 4 and description).

72. As to Claim 12, Shin et al teaches: the step of building a basic model of the seat assembly surface on the simulation software further includes the steps of: modeling the seat geometry (page 574, column 2, lines 10-14; page 577, column 2, paragraph 2; Table 4 and description); determining the joint properties (Abstract, line 6-9; page 573, column 2, lines 16-21; Figure 3 and description; page 577, column 2, paragraph 2; Table 4 and description; page 578, column 2, lines 11-15; page 579, paragraph 1); modeling the foam and suspension stiffness (Abstract, line 6-9; page 577, column 2, paragraph 2; Table 4 and description); positioning the test dummy into the modeled seat assembly (Figure 3); and validating the contact points between the test dummy and the modeled seat assembly (Abstract, line 6-10; page 577, column 2, paragraph 2).

73. As to Claim 13, Shin et al teaches: the step of determining which seat parameters of the basic model are most significant to meeting the desired objective further includes the steps of: identifying the seat parameters with the potential to influence the test dummy in rear impacts (page 547, column 1, lines 6-10; page 577,

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paragraphs 1 and 2); determining the optimization range for each of the identified seat parameters (page 578, column 1, line 23-column 2, line 9; Table 4); optimizing each of the identified seat parameters separately (page 578, column 2, lines 9-15); determining the overall significance of each of the identified seat parameters (page 579, paragraph 1 and Table 7); disregarding the identified seat parameters having little or no significance on the rear impact performance of the basic model (page 579, paragraph 1, Table 7); and determining ideal ranges for each of the significant seat parameters when combined with the other significant seat parameters (page 580, column 1, lines 6-11).

74. As to Claim 14, Shin et al teaches: the step of building a detailed model of the seat assembly on the simulation software further includes the steps of: modeling the seat geometry (page 574, column 2, lines 10-14; page 577, column 2, paragraph 2; Table 4 and description); determining the material properties for the seat structure components (Abstract, line 6-9; page 577, column 2, paragraph 2; Table 4 and description); positioning the test dummy according to sled test data (Figure 3); and validating the contact points between the test dummy and the modeled seat assembly (Abstract, line 6-10; page 577, column 2, paragraph 2).

75. As to Claim 15, Shin et al teaches: wherein the step of determining which of the seat parameters of the detailed model are most significant to meeting the desired objective further includes the steps of: identifying the seat parameters previously determined to be significant to the rear impact performance of the basic model of the seat assembly (page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); optimizing each of the seat parameters separately by running simulations on the

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detailed build (page 578, column 2, lines 9-15); determining the overall significance of each of the seat parameters (page 579, paragraph 1 and Table 7); and disregarding any seat parameters having little or no significance in meeting the desired objective (page 579, paragraph 1, Table 7).

76. As to Claim 16, Shin et al teaches: wherein the step of optimizing the most significant parameters to best improve rear impact performance further includes the steps of: identifying the seat parameters previously determined to be most significant to the rear impact performance of the detailed model (page 574, column 1, lines 6-10, 17-19; page 577, column 2, paragraph 1); running simulations on the detailed model with various combinations of the most significant seat parameters to determine the best combinations and ranges of those seat parameters (page 578, column 1, line 23-column 2, line 17; Table 4); and choosing one best combination for meeting the desired objective of the seat assembly (page 578, column 2, lines 13-15).

Conclusion

77. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

78. Eriksson, Linda ("Three-Dimensional Mathematical Models of the BioRID I and Car Seats, for Low-Speed Rear-End Impacts", Traffic Injury Prevention, Vol. 3, No. 1, pages 75-87, January 2002) teaches the development and validation of three-dimensional mathematical multi body system models of the mechanical BioRID I and of seats with different properties, to be used in low speed rear-end impacts.

79. Rashidy et al, ("Analytical Evaluation of an Advanced Integrated Safety Seat Design in Frontal, Rear, Side and Rollover Crashes", Proceedings of the Seventeenth International Conference on Enhanced Safety of Vehicles, Paper No. 305, Amsterdam, The Netherlands, June 2001), teaches the results of analytical modeling and simulations of the Advanced Integrated Safety Seat for frontal, rear, side and rollover crash modes.

80. Bigi et al, ("A Comparison Study of Active Head Restraints for Neck Protection in Rear-End Collisions, Proceedings of the 16Th International Technical Conference on the Enhanced Safety of Vehicles (ESV), Windsor, Ontario, Canada, May 31-June 4, 1998) teaches a comparison of different active head restraint concepts, validation using sled tests and test dummies, the modeling and validation of a generic seat using data from tests and optimizing the design through the optimization of model parameters.

81. Park et al, ("Crash Analyses and Design of a Belt Integrated Seat for Occupant Safety", Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering", Vol. 215, No. 8, pages 875-889, 2001), teaches evaluating the performance of a belt integrated seat using a sled test and occupant analysis software and the optimization of the design.

82. Singer et al (US Patent 5,636,424) teaches a vehicle safety seat that supports an occupant and includes structure interconnecting the seat and the vehicle. The interconnecting structure is adapted to constrain the seat upon vehicle deceleration, to follow a trajectory with respect to the vehicle which substantially minimizes a cost function associated with occupant injury.

83. Cooper et al (US Patent 6,904,399) teaches a tool to create a simulation-based environment that allows a product-based restraint engineer, with a modest understanding of complex software programs, to use complex math models i.e. MADYMO.TM., to solve product-based issues. The MADYMO.TM. simulation software, which is widely available, currently requires an experienced simulation modeling expert to model a complex simulation such as a vehicle crash and then interpret the results.

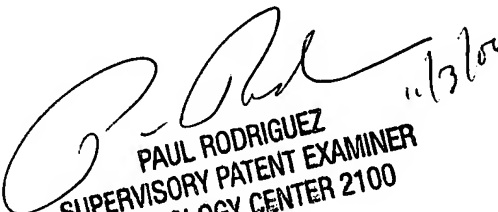
84. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C. Jacob whose telephone number is 571-272-6249. The examiner can normally be reached on M-F 7AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner
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